

## PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

## An Automatic Sponge for Guns

I, VALENTINE ACHIKRITOVITCH GANIN, of Vokzalnaja util'tsa 19, app. 23, Kaliningrad, Union of Soviet Socialist Republics, a Soviet Citizen, do hereby  
 5 declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

10 This invention relates to an automatic sponge for guns. With the existing methods of cleansing the bores of gun barrels, the process of sponging (taking  
 15 off of carbon and copper deposits as well as rinsing) is associated with extreme difficulties and requires the expenditure of considerable forces and time, especially with large calibre guns, wherein a  
 20 manual cleaning by means of sponges, mounted upon rods, involves excessive difficulties. For instance the manual sponging of a 12 in. gun requires the  
 25 simultaneous activity of 25 to 40 men, who are busied for some scores of hours. The forces to be applied to the rod of the sponge when cleansing deep threads and  
 30 long barrels (up to 50—60 feet) amount indeed to 1100—1700 lbs. and thereby involves the toil of a large gang of men. Methods of mechanical cleansing of  
 35 bores of gun barrels (and particularly of sponging) proved to be exceedingly bulky and difficult and besides did not provide the necessary safety when in use. There were proposed such arrangements  
 40 as winch traction installations, arrangements with reciprocated rope traction actuated by automatic winches, compressed air cleaning devices with an  
 inertia body and so on, but their use is associated with bulky mechanisms and slow working.

The present invention consists in a  
 45 sponge for the automatic cleansing of gun barrels, comprising a fore part and a rear part, each provided with a brush made up of tufts of steel wire or the like, the fore part being connected by means

of a rod to the piston of a steam or compressed air engine which is arranged in  
 50 the rear part of the sponge, and a hose for supplying the working medium to the said engine, the said tufts being of a suitable length to ensure that, when the  
 55 sponge is inserted in the barrel of the gun, the tufts will be capable of bearing against the interior of the barrel at such an inclination thereto that the fore part will be displaced forwardly during the  
 60 forward stroke of the said piston while the tufts of the brush on the rear part will produce a wedging action and resist the tendency of the rear part to move  
 65 backwards, and, during the return stroke of the piston, the brush on the fore part will resist the tendency of the fore part to move backwards with the piston, whereby the rear part will be driven forwardly.

By means of this arrangement, the  
 70 sponge is progressively displaced along the entire length of the gun barrel, and in order to control the rate of this displacement, a rope is provided which is attached to the rear part of the sponge  
 75 and is wound up on a winch, so that by unwinding the rope at a predetermined speed the rear part can be positively retarded to ensure the required rate of  
 80 advance of the sponge along the inside of the gun barrel.

The sponge for the mechanical cleansing  
 85 of gun barrels according to the invention has relatively small weight and consists of simple mechanism, which would occupy little space and be inexpensive, while being easily manipulated.

One advantage of the present invention consists in its automatic quality, the number of operators needed for the  
 90 working of the sponge according to the invention being reduced to one or two.

Another advantage of the present invention is the shortening of time to be spent upon the cleansing of the gun  
 95 barrel, which is brought down to about

one or two hours.

The automatic sponging device according to the present invention, is based on the difference of efforts, which are to be spent during the forward and backward motion of the sponge in the gun barrel.

The principle of action of the automatic sponge will be now described in more detail with reference to the accompanying drawings, in which:

Fig. 1 is a diagrammatical view of the principle of action of the forces upon which the construction of the sponge according to the present invention is based.

Fig. 2 shows a diagrammatical view of the section of a gun barrel with the sponge of the present invention brought in for the purpose of cleansing the barrel.

Referring to the drawings, the sponge comprises a fore part 1 and a rear part 5 fitted with brushes 2, 3, respectively. The fore part 1 of the sponge is connected by means of a rod 4 to the piston of a steam or compressed air engine, the cylinder 11 of which is arranged in the rear part 5 of the sponge. The working medium is led to the engine cylinder 11 by means of a hose 7 which supplies the working medium to a distributing device comprising a slide valve operating in a valve casing 12, the slide valve mechanism not being shown, being of a type already known and used, for instance in air-stream pumps on railway engines or steam engines.

The brush 3 of the rear part of the sponge comprises tufts of steel wire or of a particular kind of grass fixed on the circumference of an easily detachable ring which encircles the body of the engine, the brush 2 of the fore part consisting of similar tufts upon the circumference of the said part, the said brushes being adapted to perform the cleaning of the gun barrel when the sponge is in use.

As shown in Fig. 1, during the forward stroke of the piston, the fore part 1 is acted on by a force  $P_f$  tending to displace it in the direction of the arrow A, and the rear part 5 by a force  $P_b$  tending to displace it in the direction of the arrow B. During the return stroke of the piston, the force  $P_f$  acts on the rear part 5, tending to displace it forwardly in the direction of the arrow D, while the force  $P_b$  acts on the fore part 1, tending to displace it rearwardly in the direction of the arrow C. At the ends of the respective piston strokes the forces  $P_f$ ,  $P_b$  are reduced to zero. Any movement of the rear part of the sponge 5 in the direction of the arrow B, however, during the forward stroke of the piston, is impeded by

the tufts 3 the length of which has a predetermined value such that when the sponge is inserted in the barrel of the gun they will bear rearwardly against the interior of the barrel at such an inclination thereto that they will impede any movement of the part 5 in the direction of the arrow B, i.e. rearwardly. The rod 4 will thus be driven forwardly and impart a forward movement in the direction of the arrow A to the fore part 1 of the sponge, on the forward portion of which (not shown in the drawing), a felt ring and an annular tank carrying kerosene or other liquid adapted to soften the deposit of carbon may be provided, in addition to the wire tufts of the brush 2.

Similarly, when the piston is performing its return stroke, any displacement of the fore part 1 in the direction of the arrow C is impeded by the tufts 2, whereby the rear part of the sponge is forced forwardly. Such displacement of the rear part of the sponge is deliberately held up by means of a steel rope (8), fastened to some device, as for instance a winch (9) (Fig. 2). When the rope is smoothly unwound at a predetermined speed, the interconnected system of sponges is displaced at a predetermined speed along the entire length of the gun barrel (10), thus performing the cleansing action. In normal working conditions the number of strokes performed by the rod in a minute and consequently the number of reciprocating movements of the fore sponge amounts to 50-60 double strokes. By matching a suitable speed of the unwinding of the rope (8) off the winch (9) the linear travel of the rope may be so proportioned with respect to the strokes of the piston in such a way that the sponge is displaced along the inside of the barrel over a distance equal to the magnitude of the stroke during the period when the fore sponge is performing several scores of double strokes.

In the drawing Fig. 2 the movement of an automatic sponge is shown as started from the extremity of the muzzle, however it is understood, that a cleansing of the gun barrel may be performed as well from the chamber end of the gun.

The use of steam as a working medium with the arrangement described presents an additional advantage in that the exhausted steam after leaving the engine may soften the burnt powder deposit, this feature being of especial importance in winter months.

It is to be noted that when performing the greasing and wiping, the same engine may be set on to work with compressed air in these cases when the effect

of steam is undesirable.

Having now particularly described and ascertained the nature of my said invention and in what manner it is to be performed, I declare that what I claim is:—

- 5 1. A sponge for the automatic cleansing on gun barrels, comprising a fore part and a rear part, each provided with a brush made up of tufts of steel wire or the like, the fore part being connected by means of a rod to the piston of a steam or compressed air engine which is arranged in the rear part of the sponge, and a hose for supplying the working medium to the said engine, the said tufts being of a suitable length to ensure that, when the sponge is inserted in the barrel of the gun, the tufts will be capable of bearing against the interior of the barrel at such an inclination thereto that the fore part will be displaced forwardly during the forward stroke of the said piston while the tufts of the rear part of the sponge will produce a wedging action and resist the tendency of the rear part

to move backwards, and, during the return stroke of the piston, the brush on the fore part will resist the tendency of the fore part to move backwards with the piston, whereby the rear part of the sponge will be driven forwardly.

2. A sponge for the automatic cleansing of gun barrels as claimed in claim 1, characterised by the feature that a rope attached to the rear part of the sponge and wound on a winch prevents the forward motion of the rear part during the return stroke of the piston.

3. A sponge for the automatic cleansing of gun barrels as claimed in claim 1 or 2, in which the exhaust steam of the engine is utilised to soften the deposit of carbon in the gun barrel.

4. An arrangement intended for the automatic sponging of gun barrels, according to the description and drawings.

Dated this 16th day of July, 1946.

MARKS & CLERK.

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Fig. 1

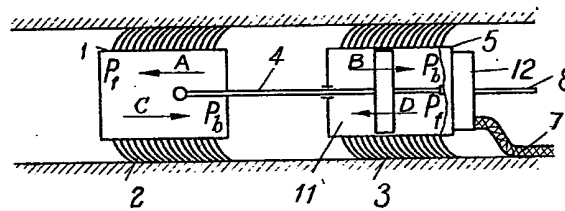
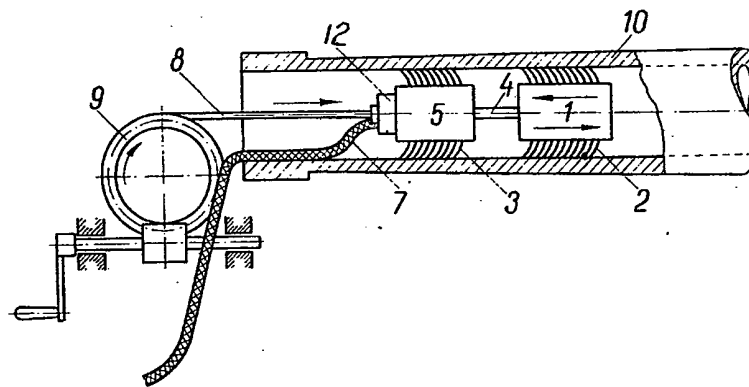


Fig. 2



[This Drawing is a reproduction of the Original on a reduced scale.]